



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/069,076 | 02/21/2002 | Koji Ueda | 313MC/50926 | 9127 |

7590

06/26/2003

Crowell & Moring
PO Box 14300
Washington, DC 20044-4300

| EXAMINER |
|----------|
|----------|

LAVILLA, MICHAEL E

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1775

3

DATE MAILED: 06/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
10/069,076

Applicant(s)
UEDA ET AL.

Examiner
LA VILLA

Art Unit
1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Feb 21, 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Feb 21, 2002 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☒ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 1 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:
2. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - I. Regarding Claims 1 and 6, it is unclear what is meant by the phrase "one kind of titanium alloys of beta type titanium alloys, near type [beta] titanium alloys and alpha + beta type titanium alloys." Do "kind" and "type" refer to the specified categories of titanium alloy or to something akin to the specified categories of titanium alloy? Note that use of "type" is indefinite in a claim. Ex parte Copenhaver, 109 USPQ 118. Regarding Claim 1, it is unclear what is meant by the phrase "near type." Should this be "near beta type"?
 - II. Regarding Claims 5, 7, 14, 29, and 30, it is unclear what is meant by the phrase "one kind of materials." Does "kind" refer to the specified categories of materials or to something akin to the specified categories of materials?
 - III. Regarding Claim 8, it is unclear what is meant by the phrase "a titanium alloy of beta type titanium alloys, near beta type titanium alloys and alpha + beta type titanium alloys." Does "type" refer to the

specified categories of titanium alloy or to something akin to the specified categories of titanium alloy? Note that use of "type" is indefinite in a claim. Ex parte Copenhaver, 109 USPQ 118. It is unclear what is meant by the phrase "the raceway surface of the outer member, the inner member and the rolling elements has." Should "surface" read "surfaces" and should "has" read "have"?

- IV. Regarding Claims 21 and 22, it is unclear what is the antecedent basis of the phrase "the raceway surface hardening layer" as there is no previous mention of this layer. It is unclear how a raceway surface layer is formed by providing a layer on the rolling element.
- V. Regarding Claims 23 and 24, it is unclear what is the antecedent basis of the phrase "the titanium alloy." Does this refer to alloy of both inner and outer member if both are comprised of the claimed alloys? When both have a titanium alloy and the alloys are different, must the condition be satisfied for both alloys and its member? It is unclear what is meant by the phrase "the portion from the raceway surface to a depth corresponding to $2/100$ to $5/100$ for the diameter of the rolling element." Does this phrase mean that the claimed E and H values are ascertained in a region under each raceway surface, in the region from $(2/100)*D$ to $(5/100)*D$, where D is the diameter of the rolling element?
- VI. Regarding Claim 26, it is unclear what is meant by the phrase "the heat expansion coefficient α_1 of the outer member and the inner

Art Unit: 1775

member.” It is unclear what is claimed when the heat expansion coefficients are not identical for these members. Is identity an implied limitation?

- VII. Regarding Claim 29, with respect to dependency on Claim 19, it is unclear what is being claimed as Claim 19 demands that the rolling element be comprised of superhard alloy or cermet and Claim 29 appears to allow for other kinds of materials.
- VIII. Regarding Claims 5, 17-24, 26, and 29, it is unclear what is the antecedent basis of the phrase “the rolling element” in each of these dependent claims, as the independent claim makes reference to “rolling elements.” Must all or only one rolling element meet the requirements of the dependent claim?
- IX. Regarding Claim 28, it is unclear what is the antecedent basis of the phrase “the surface.” Which surface(s) is/are this?

Claim Objections

- 4. Claim 29 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. With respect to the dependency of Claim 29 on Claim 19, it is unclear how the claim is further limiting as Claim 19 appears to preclude the rolling element’s comprising several of the ceramic materials allowed for by Claim 29.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
6. A person shall be entitled to a patent unless –
 - (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
 - (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
7. Claims 1, 2, 5, 11-14, 17, 22, and 29 are rejected under 35 U.S.C. 102(a and e) as being anticipated by Ueda et al. USP 6,250,812. Ueda et al. teaches a raceway structure having rolling elements therein, wherein the rolling elements may comprise SiN. Some of the raceway members comprise the claimed titanium alloys. See Ueda et al. (Figures 4 and 8; col. 2, lines 40-54; col. 3, line 58 through col. 4, line 55; col. 5, lines 55-68; col. 6, lines 40-47; col. 7, line 42 through col. 8, line 29; col. 9, lines 20-33; col. 9, line 59 through col. 10, line 34; col. 10, line 51 through col. 11, line 57; col. 19, lines 35-53; col. 20, lines 1-38; col. 21, line 49 through col. 22, line 63; Table 4; col. 26, lines 26-59; col. 31, line 51 through col. 32, line 52; and Table 9).
8. The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be

Art Unit: 1775

overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1, 5, 11-13, 17, and 29 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Takagi et al. JP 11-153140. Takagi et al. teaches a raceway structure having rolling elements therein, wherein one rolling element comprises silicon nitride. Ueda teaches that bearing washers may comprise various titanium alloys. See Ueda et al. (Abstract ; Figures 1-3 ; and paragraphs 9-11, 22, 31, 38, and 42). Ueda et al. may not exemplify an article containing a

Art Unit: 1775

claimed titanium alloy as a bearing washer, but teaches that alloys comprising about 4 vol. % Cr comprise beta phase. It would have been obvious to one of ordinary skill in the art at the time of the invention to use bearing washers of about 4 vol. % Cr in titanium as Ueda teaches that effective structures may utilize alloys of this composition. The titanium alloy would be expected to possess a native oxide coating that is hard. The surface of the 4 vol. % Cr containing titanium is described as having hardness HRC about 57, which corresponds to Vickers Hardness of about 600. See Ueda et al. USP 6,250,812 at col. 6, lines 40-47.

12. Claims 1, 3, 4, 11-13, and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al. JP 2000-035043. Ueda et al. teaches a raceway structure having rolling elements therein, wherein the raceway is comprised of beta titanium alloy and is coated with titanium oxide layer. See Ueda et al. (Abstract; paragraphs 22-24, 36, 37, 51-54, 77, 82, 87, 88, and 95; and Tables 1 and 3). Ueda may not exemplify an alloy having the claimed hardness, but teaches that the claimed hardness values are desirable. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the raceway member from beta titanium alloy having the claimed hardness values, as Ueda teaches that members having such hardness are effective. Ueda teaches that coating with rutile titanium oxide of the claimed thickness and further coating with lubricant provide for effective articles. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate

Art Unit: 1775

the rolling device of Ueda with the rutile titanium oxide coating of the claimed thickness and further coated with lubricant as Ueda teaches that effective rolling bearing devices result. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the device of Ueda with a rolling element comprised of SUJ2 as Ueda teaches that such rolling elements are effective. The heat conductivity of this material is 50 W/mK. See Yamamoto et al. USPA 2001/0036328 (paragraph 193).

Allowable Subject Matter

13. Claims 7, 9, 10, 20, 21, 23-28, and 30 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
14. Claims 6 and 8 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.
15. Neither the reviewed prior art nor the prior art of record appears to teach or suggest the claimed subject matter of Claims 4, 6-10, 14, 20, 21, 23-28, and 30. With respect to Claims 6 and 8, the claimed hardness levels of Claim 6 with the cage heat conductivity values and the claimed omega phase feature of Claim 8 do not appear to be taught or suggested. Those dependent claims that are indicated to be allowable claim cage features or physical properties that, in

Art Unit: 1775

combination with the features of the respective independent claims, are not taught or suggested by the prior art.

CONCLUSION

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (703) 308-4428. The examiner can normally be reached on Monday through Friday.
17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.
18. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Michael La Villa
June 18, 2003

A handwritten signature in black ink, appearing to read 'La Villa', is written over the typed name and date.